AL.2.1989-328

CANADIANA
C2
JUL 14 1989

DIRECTIONS

ALBERTA
RESEARCH
COUNCIL

Directions

> "In no other province of Canada is the provincial research organization so central to the economic well-being of the province."
>
> – C.W. (Clem) Bowman

Digitized by the Internet Archive
in 2017 with funding from
University of Alberta Libraries

https://archive.org/details/directions00albe

Foreword

The Alberta Research Council's Long Range Plan, published in 1979, endorsed a commitment towards both natural resources and new technologies, and thus mirrored the evolution of the province's economic policies. The Long Range Plan called for major emphasis on energy resources – specifically oil sands and coal technology research; increased assistance to Alberta companies through new and flexible working relationships; and support for the development of the frontier sciences needed to provide a foundation for future economic development.

Today, the Alberta Research Council operates a major oil sands and hydrocarbon recovery research facility at Clover Bar and has established its coal research at the Coal Research Centre at Devon. The location of a regional office and laboratories in Calgary, with satellite offices in Lethbridge and Red Deer, has given the Research Council a focus on advanced technologies and an expanded presence in Alberta. In Edmonton, the new facilities which opened in 1986, include a biotechnology pilot plant, the only one of its type in Canada, the Electronics Test Centre to support the telecommunications and electronics industries, and testing laboratories to assist Alberta's forest products industry.

The Alberta Research Council can look at the record of the last decade with pride – on the whole, a good record, with some daring moves resulting in major contributions to the province. As we get ready for the challenges in the decade ahead, what should be our new DIRECTIONS? This document describes where we are now and outlines our goals and strategies for the 1990s.

April, 1989

Contents

Foreword 1
Profile 3
Mission Statement 6
Strategic Directions 7
A New Implementation Focus 18
Organizing for the 1990s 19
Our Commitment 23
Appendix – Research Activities 25

Profile

A bold move in 1921 led to the establishment of the first provincial research council, and the start of mapping and development programs for Alberta's natural resources

When the Alberta Research Council was founded in 1921 by the provincial government, organized scientific and industrial research was in its infancy. Moreover, no other provincial jurisdiction had taken such a step. From the outset, the objective was clear: the new research organization would be designed to support economic development through the application of scientific and engineering expertise, and in the process, improve life in rural and urban Alberta.

In its first two decades, a small, dedicated group of researchers began earth resource mapping and modest investigative programs related to coal, natural gas, and road materials, and provided technical advice to both industry and government. This essential work laid the foundation for the development of Alberta's mineral and soil resources and has contributed significantly to the province's economic growth.

Progress in the depression years was hampered by a lack of funds, and during the Second World War, by a lack of trained personnel. The 1950s were characterized by a period of growth and diversity; by the end of the decade, new projects related to agriculture, groundwater studies and hail research were added to the list of activities.

The post-war era, coupled with the discovery of oil in Leduc in 1947, saw the province changing rapidly from a rural to an industrial economy. To address the growing demand for technical expertise, the Research Council expanded its industrial and engineering services, and in the 1960s established the Clover Bar pilot plant to facilitate closer interaction with industry.

Industrial liaison expanded during the 1970s, covering a broad range of industries

During the 1970s, the Alberta Government intensified efforts to diversify the economy to reduce the economic dependence on the primary resource industries.

The first stage of diversification was based on petrochemicals and higher value-added products derived from the resource industries. The Research Council responded to these challenges with projects in the pipeline transport of solids and the development of a gas separation process based on dry membrane permeation technology. In 1975, the Alberta Oil Sands Technology and Research Authority (AOSTRA) initiated a major oil sands technology program at the Alberta Research Council with emphasis on in situ recovery. The Research Council also expanded its coal technology research, focusing particularly on coal/oil agglomeration and coal liquefaction, and has moved from bench-scale to pilot-scale experiments at Nisku.

A dual resource industry/high technology strategy evolved in the province in recognition of the need for continued advancement of the resource industries and a parallel development of high technology industries, especially in biotechnology, microelectronics, and computer software.

In the 1980s programs were aligned to fit the dual provincial economic strategy:

- ***continued emphasis on natural resources***
- ***the parallel development of high technology industries***

The Research Council's Long Range Plan, published in 1979, laid out the objectives to meet that strategy. The plan also addressed the forest products industry, recommending that the Research Council work closely with government departments to initiate programs to increase the harvest of this abundant resource.

With the Long Range Plan spelling out the direction for the organization, the Research Council embarked on a period of unprecedented activity. New facilities at Devon brought the Research Council, the Canada Centre for Mineral and Energy Technology (CANMET) and the Coal Mining Research Company

The 1979 Long Range Plan defined the scope of the Alberta Research Council during the 1980s:

- ***Oil sands***
- ***Coal***
- ***Industrial support***
- ***Frontier sciences***

The next challenge – getting ready for the 1990s

together and allowed expansion of the oil sands activity at Clover Bar. A new engineering office building is currently under construction at Clover Bar. A research facility was established in Calgary, dedicated to working with the growing private sector in the areas of computer-based systems, information and automation technologies. The inadequate and scattered Edmonton laboratories and offices were consolidated in new headquarters in south Edmonton with three major facilities: the Electronics Test Centre, forest products testing laboratories and a biotechnology pilot plant. The Electronics Test Centre addresses the needs of the telecommunications and electronics sectors by providing "one-stop" testing and engineering development capabilities for local, national and international electronics manufacturers. The forest products testing laboratories offer Alberta manufacturers of panel products a range of services vital to their market needs.

Perhaps the most visible illustration of the ability of the Research Council to look to the future and adapt to a rapidly changing world is its biotechnology program. Today, the Research Council has in place the best equipped pilot scale-up facility in Canada and is rapidly acquiring an international reputation for its expertise within the biotechnology community.

The goal to become better known within and beyond Alberta among the groups with which it interacts – industry, government departments and agencies, the universities, other organizations and the public – has brought the Alberta Research Council into prominence as one of the Alberta Government's cornerstones in its drive toward economic development of the province.

Mission Statement

The mission of the Alberta Research Council is to advance the economy of the province by:

- promoting technology development,
- performing applied research, and
- providing expert advice, technical information and a scientific infrastructure that is responsive to the needs of the private sector and supports the activities of the public sector.

Strategic Directions

Today's rapid technological change and global competitiveness make it imperative that organizations adopt flexible and innovative approaches in their operations. This demands new strategies to manage existing programs while introducing new ideas and new priorities. The mechanisms to permit the integration of these ideas, both for today and in the future, must be developed.

Strategic program directions are identified

- ***Linking high technologies and resource industries***
- ***Providing access to national and international technologies***
- ***Maintaining resource inventory/ assessment programs***
- ***Balancing short and long term research needs***

The Alberta Research Council recognizes the importance of supporting Alberta's resource industries, expanding high technology industries, and in particular, the importance of linking these two sectors to mutual advantage. The Research Council also recognizes the importance to Alberta's economy of the national and international flow of technology. This is the framework within which the Research Council is committed to maintain expertise and effectiveness.

With its direct role in natural resources development, the Alberta Research Council historically has been closely allied to, and supported by, the provincial government. As the home of the Alberta Geological Survey and the provincial component of the Alberta Soil Survey, the Research Council will continue its traditional role in collecting, evaluating, maintaining and providing natural resources information.

The Research Council believes that it has two additional roles: as a "research arm" of the provincial government, and as the provider of research and technical services required by private industry. The challenge now and in the future lies in the pursuit of science and technology to solve industry's problems. Research institutions in supporting the requirements of industry are finding that their operations are increasingly being funded by their private sector clients.

Figure 1. Financing of Provincial Research Organizations, 1987

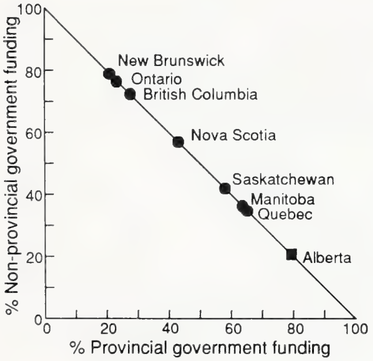
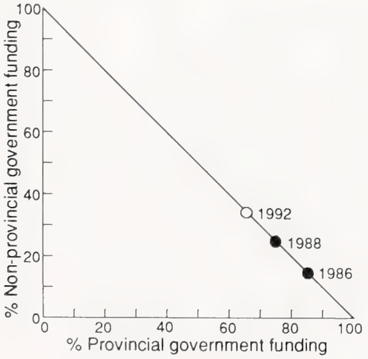


Figure 2. Funding goal of the Alberta Research Council

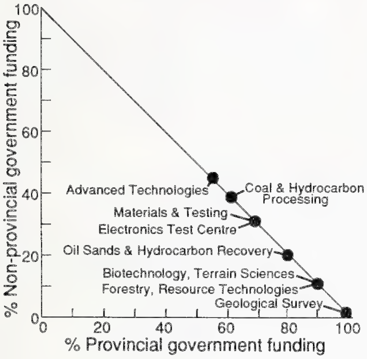


In both the public and private sectors, research budgets have been under severe cost-cutting pressures at the same time that expectations for innovative technical process and product development are increasing. No longer should government laboratories function in isolation from the industrial world around them. Nor should they rely solely on government funding. As the amount of short-term contract research expands, the balance between applied research and long-term research needed to support future technological innovation, becomes critical.

The Alberta Research Council is better funded in its research programs by the provincial government than its counterparts in other provinces. The percentage of provincial government funding to the percentage of income from other revenue sources for all provincial research organizations is shown in Figure 1. It is noteworthy that the Alberta Research Council currently relies on provincial government funding (grant plus contracts) for more than 75 per cent of its total budget. The Alberta Research Council is fortunate that roughly half of its budget is provided as a grant from the Alberta Government. That assurance of base funding provides a measure of flexibility in balancing short-term and long-term research needs.

As a corporate objective, the Research Council is seeking a commitment from the Alberta Government for stable funding over a three- to five-year period, and is taking steps to supplement these monies by increasing contract revenues from industry and the federal government. The Research Council has set objectives for revenues from industrial and federal government contracts to reach one-third of its total funding by 1992 (figure 2). This will provide the appropriate balance between government and industry revenues to meet the challenges of the early 1990s.

Figure 3. Alberta Research Council Departments – 1988



The Alberta Research Council operates as a not-for-profit business and is accountable for its activities. The research programs at the Research Council span a wide spectrum and have differing degrees of provincial government support (figure 3). As indicated in the section on Research Activities, some of these current funding positions will change as revenue from non-provincial government sources increases. Others, such as the Alberta Geological Survey and the Terrain Sciences Department, will continue to rely heavily on Alberta Government funding. In all instances, however, program sponsors will be encouraged to allocate a portion of project funding for longer term research.

The Alberta Research Council's Relationship with the Alberta Government

The Alberta Government's science and technology policies have evolved during the past two decades to meet the challenges facing the economy in both domestic and international markets. During the 1970s, new science and technology initiatives supported the diversification into petrochemicals and the beginning in earnest of the oil sands industry. During the 1980s, a dual science and technology strategy was developed. Continued emphasis was given to the resource industries, knowing that they would continue to provide much of the wealth-generating capacity of the economy, but recognizing that there were limits to the growth in employment that these industries could provide. At the same time, a number of major initiatives were taken to foster the high technology sector, not anticipating a significant near term wealth-generating capacity, but expecting a major growth in the number of high quality jobs for a skilled work force. During the coming decade, there will be a merging of this dual strategy, whereby the high technology industries will assist the resource industries in meeting international pressures in both product price and product quality. The resource industries will, at the same time, provide a first test market for the products and expertise of the high technology sector. This will position the high technology companies to penetrate international markets.

Alberta Government moves to establish technological beachheads in

- ***electronics***
- ***biotechnology***
- ***computers***

In 1986, the Premier of Alberta announced the establishment of the Department of Technology, Research and Telecommunications to direct and focus the heightened emphasis on science and technology. The department has supported many new initiatives in high technology, particularly in microelectronics, biotechnology, computers, and computer software. These initiatives were seen as the beachhead for the advancement of the high technology industries across a broad front.

The Research Council is a major participant in these government initiatives, and will serve as one of the research arms of the government in both operating some of the research infrastructures and also in carrying out longer term applied research for various government departments.

Examples of research facilities operated by the Alberta Research Council for the government are:

- the Electronics Test Centre to provide product development and certification assistance to private sector companies,
- the Biotechnology pilot plant to provide scale-up assistance to companies ready to enter commercial markets,
- the Alberta Geological Survey to provide the resource evaluation information needed by the resource industries,

A consolidated research capability supports the needs of government departments and agencies that cannot be provided by the private sector

- the Advanced Technologies Department which helps industry to adopt advanced computing and automated manufacturing technology needed to compete in international markets.

The Research Council also provides technical resources to various provincial government departments to support their longer term strategic directions. Some of this assistance will be funded from the core grant provided to the Research Council by the Alberta Government, and some will be under contract with government departments and agencies such as AOSTRA to meet specific mission-directed goals. The Research Council will increase its efforts to involve private sector companies in these programs where there is a continuing need that can be met by the private sector.

Part of the core grant will be reserved for work on new initiatives to prepare the technological foundations needed to meet future economic opportunities. The Research Council commits to keep its facilities and staff at the leading edge of the technologies likely to have an impact on the provincial economy in the future.

The Alberta Research Council's Relationship with Industry

Research infrastructure in place – and specialized staff – assist Alberta industry

Working with industry is one of the Alberta Research Council's prime functions. The Research Council has put in place an extensive and unique infrastructure and has outfitted various specialized research and testing laboratories to support industry. It has the highly skilled staff to meet the needs of industry in broad and diverse fields of endeavor: oil sands and coal research, biotechnology, forest products development, advanced materials, electronics and computing-based technologies such as expert systems.

Technical and financial support for small- and medium-size companies expands

Support for the province's small- and medium-size companies has always been an important function for the Alberta Research Council. These companies do not have the market advantages of similar companies in eastern Canada. To help western Canada's industry become more competitive in national and international markets, the Alberta Research Council offers scientific and technical expertise and a network of information services. The Alberta Research Council acts as the provincial agency for the delivery of the National Research Council's Industrial Research Assistance Program (IRAP). As a parallel theme, the Alberta Research Council brings together its substantial array of science, technology and infrastructure to support individual companies at the "shop floor" level.

Recently the Alberta Research Council signed a Memorandum of Understanding with the federal Ministry of State for Science and Technology, and the Department of Supply and Services, which will allow the Research Council to help the private sector obtain federal government contracts. This pilot project allows the Research Council to bid on contracts for which no private sector company in the province has the capability to respond on its own. If a contract is awarded to the Research Council, at least 55 per cent of the work must be subcontracted to a private sector partner.

In addition, the Alberta Research Council sponsors a Joint Research Venture Program designed to assist Alberta companies in the development of marketable processes or products. Launched six years ago, the Joint Research Venture Program has been highly successful in the transfer of technology to Alberta industry. Under the terms of this initiative, the Research Council and a small- to medium-size company share jointly their resources (funding, personnel, equipment) in undertaking a project usually of one to two years' duration. Eight such projects have been successfully completed and another 12 are in progress.

Furthermore, through its own extensive network interface with government, the universities and industry, the Research Council plays a role in bringing government and industry together as well as in promoting industrial alliances. One example is AOSTRA's Industry Access Program, whereby research results are made available to member companies. By joining this program, industry not only becomes a player in the direction and management of the research, it has immediate access to the research results, and has non-exclusive worldwide, license fee-free rights to use the technology.

Participation in industry consortia increases

Pre-competitive consortia are playing an increasingly important role in helping industries acquire and exploit new technology. The Research Council is a founding member of PRECARN Associates Ltd., a national consortium of agencies and industry, formed in 1987 to promote and conduct research in artificial intelligence and robotics. In addition, the Research Council is evaluating other new initiatives to help industry groups respond to new challenges and opportunities.

The Alberta Research Council – Networking with Other Research Establishments

There is a growing awareness that if Canada is to be competitive in the international marketplace, its research establishments must step up their efforts to collaborate with each other in the pursuit of science and technology to solve industrial and economic problems. "Networking" among the provincial research organizations, the National Research Council, the universities and other scientific and engineering centres of excellence, is imperative to Canada's future.

The Research Council enters into a new working relationship with the National Research Council

The Alberta Research Council and the National Research Council have signed a Memorandum of Understanding to cooperate in the development and commercialization of technology needed by Canadian industry. One of the National Research Council's objectives is to meet regional needs for research and development in science and technology through cooperation with federal and provincial research organizations, universities, and local industry. A steering committee, composed of two representatives each from both organizations, has been appointed to set research objectives and priorities. Areas identified for potential joint projects include biotechnology, coal/oil agglomeration, advanced materials, construction and space research.

APRO – a Canada-wide alliance to bring national and international technology to Canadian industry

The Alberta Research Council is a member of the Association of Provincial Research Organizations Inc. (APRO). This alliance of provincial research organizations is a major supplier of science and technology to Canadian industry. The Alberta Research Council will work with the Saskatchewan and Manitoba Research Councils to strengthen the role of the provincial research organizations in western Canada and to provide a greater level of service to small- and medium-size companies throughout the region. The Alberta Research Council has the staff and facilities to participate fully in this task.

New western and Alberta partnerships expand technical services and control costs

In 1985, the Electronics Test Centre and the Saskatchewan Research Council signed a cooperative agreement in order to make optimal use of their resources. Two years later the Alberta and Saskatchewan Research Councils formally undertook to explore ways to collaborate on new initiatives by sharing their capabilities and facilities to improve the economic advantage of industry in Alberta and Saskatchewan.

Agreements are being drafted to lay the foundation for Alberta Research Council partnerships with Alberta's universities, the Alberta Environmental Centre and the private sector, in research and development and in technology transfer in a variety of fields.

A commitment to networking with Canadian centres of excellence will ensure the Alberta Research Council can bring leading edge technology to Alberta companies

The federal government, in formulating its strategy for science and technology, has announced the commitment of $240 million over four years to support networks of Centres of Excellence. The participants will be universities, industry, government and other eligible researchers. The Alberta Research Council has signified its interest and intention to be a participant by collaborating in research activities with members of these networks.

The Alberta Research Council – International Focus

Alberta Research Council, representing the Alberta Government, opens international doors for the private sector

The Province of Alberta established its first foreign office in London in 1913. Its Tokyo office was opened in 1969. Today there are also provincial government offices in New York, Hong Kong, Houston and Los Angeles. Each of these locations is of particular strategic importance to the province's economic development and diversification strategies. In addition to the offices, Alberta has established sister province relationships with Hokkaido in Japan, and Heilongjiang in China, to promote contacts and exchanges.

The proximity of Canada to the United States has fostered close associations among Research Council staff and those of U.S. research establishments and universities. A notable example is the work done in hail suppression over nearly 30 years. Research Council scientists regularly attend and are invited to present papers at U.S. scientific conferences. More recently, the Research Council's ties with the United States research community have expanded in a number of areas: in coal research, the Research Council is performing work for a large consortium headed by the Electric Power Research Institute in Palo Alto, California; in biotechnology, the Research Council's pilot plant attracted a California biological pesticide company for large scale fermentation work; in forest products, a formal agreement with the American Plywood Association will assist forest products exporters.

Foreign governments, particularly those in Asia, often prefer to negotiate with other governments, and in this regard the Alberta Research Council, as a crown corporation, is able to serve as a "door-opener" for Alberta industry. Through its scientific network, the Research Council has been developing and promoting exchanges that see its staff on secondment to foreign scientific institutions and governments in China, Japan, Indonesia, Jordan and in Europe.

The Research Council also encourages scientists from other countries to work in its laboratories, and both scientists and others to come to Alberta on exchange visits, providing further opportunities to build international contacts. In addition, as part of its business development initiative, the Research Council is registering with the World Bank and the Canadian International Development Agency (CIDA).

These ties with other countries, particularly those in the Pacific Rim, are becoming more important as Alberta and Canada expand their international commerce. The Alberta Research Council will continue to foster international links which can promote technology transfer abroad and provide access to foreign technology needed by Canadian industry.

The Alberta Research Council and the Community

With headquarters in Edmonton, the Alberta Research Council has been part of the fabric of the city since 1921. The impact of the organization's presence on the Calgary business community since the Research Council's facilities were established there in 1984 is indicative of the strength and leadership it lends to that community.

Although the Research Council's laboratories are concentrated in the two major Alberta cities, efforts to serve local industries within their own communities have broadened to Lethbridge, Medicine Hat, Red Deer and the surrounding regions. The Board of Directors and senior management also arrange to hold some of their regular meetings outside of Edmonton and Calgary to meet with business and community leaders in the province and promote the Research Council and its services.

Through a variety of public events, the Alberta Research Council aims to enhance the public's understanding of the role of science and technology

As a major research organization in the province, the Research Council has a responsibility to promote the understanding of science and the consequence of its application to Albertans. The Research Council arranges open houses of its laboratories for specific audiences and for the general public; it sponsors workshops and seminars for industry, and its staff are speakers to external groups; it supports students through awards and scholarships; and it promotes its activities through various media.

A New Implementation Focus

The Alberta Research Council came into being as an instrument for developing the province's natural resources; over the past six decades, its mandate has expanded to encompass a much broader range of technological development aimed at advancing the province's economy. To accomplish its mission in the decade ahead, the Research Council must broaden the scope of its vision and activities.

In keeping with its mission statement, the Alberta Research Council will:

- develop strategic alliances with the private sector to perform generic research;
- promote joint projects and the establishment of consortia with the private and public sectors;
- provide for client input into its program definition and execution;
- provide assistance to, and minimize competition with, the private sector;
- forge collaborative links with other Alberta research institutes and universities to enhance overall research effectiveness;
- join collaborative associations with other Canadian research organizations;
- establish business development and marketing procedures as important Research Council functions; and
- more actively pursue international opportunities.

Organizing for the 1990s

The Alberta Research Council's resources will be used to find innovative and effective technology to meet the short and long term needs of our clients, and thereby promote the economic development of our province.

The corporation's research departments have changed radically over the past decade. Some departments and programs did not exist 10 years ago and the nature of the research continues to evolve with new departments emerging and old ones being transformed to reflect changes in technology and client demand. It is most likely that the programs of the Research Council will be substantially different by the turn of the century. There is, however, one immutable goal. As the Alberta Research Council organizes for the decade to come, it reaffirms its commitment to its corporate mission to advance the economy of the province, and its dedication to excellence in performing that mission.

Alberta's economic development depends on science and technology and its future economic prosperity will be promoted by making industry technology intensive. The accelerating pace of technological innovation and technology transfer requires new approaches to meet these challenges. In order to support Alberta's economy through science and technology, the Alberta Research Council must be ready to apply its resources and expertise in new fields of endeavor and to set objectives which encompass leading edge research.

Program renewal "making room" for new initiatives

New ideas, new technologies with new applications, and a solid base in natural resources expertise are the building blocks of the Alberta Research Council. New programs are emerging and being developed – a number of these initiatives such as the biotechnology pilot plant expansion are already coming to fruition. As this happens, other new initiatives will be identified. Examples of current new initiatives are provided on the following two pages.

Land-related information management is an exciting new initiative

Land-Related Information Systems/Geographic Information Systems (LRIS/GIS) technology includes and integrates all the technologies involved with automated decision support systems for land-related or spatially referenced information. These technologies include interactive graphics, relational database design, hardware, software, remote sensing, numerical modeling, and expert systems.

LRIS/GIS technology will be implemented in Alberta by integrating a number of existing industries, including surveying and mapping, photogrammetry, EDP, and various natural resource service industries. The Research Council is working with various government departments and agencies to establish an Alberta-wide LRIS/GIS program, involving the private sector and appropriate municipalities. The Research Council has the ability to promote and support the development of an Alberta-based LRIS/GIS industry that is competitive worldwide.

Support for Canada's space research is under way

The Canadian Space Program is a $1.4 billion initiative which includes RADARSAT (Synthetic Aperture Radar observations from space), MSAT (Mobile Satellite Communications), MSS (Mobile Servicing System) of the planned space station, and space experiments. The space station is to be launched in 1992. Anchored outside the space station, the MSS will perform servicing duties. Western provinces will earn $160 million of the Canadian portion directed to MSS.

The Alberta Research Council is qualified to take an active and leading role in the Canadian Space Program, in conjunction with regional partner industries. The Advanced Technologies Department, through its expertise in expert systems and robotics, has been chosen with its industrial partners to conduct four of eight feasibility studies in the Strategic Technologies Development program.

The Biotechnology Department has already conducted space experiments in partnership with SED Systems Inc. of Saskatoon. Expertise and facilities at the Research Council in expert systems, robotics, testing and biotechnology are unique in western Canada. They will be used to bring western region companies together by supplying them with appropriate technical support and to help small companies, which would otherwise be unable to develop sufficient capability to enter the competition for funds.

Hydrogen research will help the energy sector

The Advisory Group on Hydrogen Opportunities, established by the Federal Minister of Science and Technology, has recommended an integrated Canadian program involving hydrogen production, purification, distribution and storage, as well as the addition of hydrogen to fossil fuels, integration of energy sources, and the development of specific hydrogen-fueled products. This initiative will benefit from the involvement of industry throughout Canada.

The Alberta Research Council is prepared to participate with industries, provincial and federal governments, and with the Hydrogen Industry Council to appropriately capture opportunities which have been identified for hydrogen. The Alberta Research Council intends to adopt a leading role, and with the Hydrogen Industry Council, to coordinate a national network toward enhancing the fossil fuel industry. This commitment assumes the federal government will establish a hydrogen development fund with arrangements to cost-share research projects with industry.

A new initiative to assist the Canadian construction industry

With the Alberta Research Council's encouragement, the Alberta chapters of the Canadian Construction Research Board (CCRB) have created a Construction Technology Centre in the province to provide two principal activities: the delivery of technical information, advice and problem-solving assistance, and the development of a centre of research in a major area of construction technology such as expert system development. Both proposed activities for the centre are envisaged as being part of a national network of construction technology support service designed to strengthen the Canadian construction industry.

The Alberta Research Council supports the view that an opportunity exists for Alberta to provide services to the prairie region and specific research support to the rest of the country. Two National Research Council construction technology advisors have been assigned to Edmonton and Calgary. The expert systems laboratory is being set up at the Alberta Research Council's Calgary site, and will be staffed by scientists from both the National and Alberta Research Councils.

The Alberta Research Council recognizes that one of the most effective ways of achieving the maximum benefit from its research effort is through the collaboration and sharing of resources. Thus, it is actively promoting participation with government and private sector partners in mutually determining goals, selecting projects and their application. A business and marketing program is being developed to ensure that the Alberta Research Council is responsive to the needs of its clients and that industry will benefit from the Research Council's many activities.

Research departments will be more closely linked to their clients, with more autonomy for program development

To broaden the opportunities for participation in the decision-making process and give more autonomy to those directly involved in program activities, the Research Council has made changes in its management structure. Research department heads have been given more autonomy for program development and have been appointed to the decision-making Research Committee.

The Research Council provides a core of support services to its research departments, and in some cases, offers these services to external clients. In keeping with the corporate goal to be a pacesetter organization, the Research Council is committed to maintaining these services at a high professional standard, on a cost-effective basis, and in response to the needs of the users of these services.

Our Commitment

A commitment to pacesetter performance in scientific excellence and technology transfer

The Alberta Research Council strives to be a pacesetter organization, committed to scientific excellence and effective technology transfer. It believes that every employee has a contribution to make in shaping the organization's future. Only through individual commitment to the Research Council's mission can the goals for the 1990s be achieved. In return, the corporation believes that every individual should receive support and encouragement toward career advancement, and recognition for his or her contributions to the life of the organization.

Looking to the 1990s, a strong, entrepreneurial Alberta Research Council is well prepared to meet the future with confidence.

The following is the commitment of the organization and a credo for all employees.

Serving Albertans through science and technology

- By focusing on issues of relevance to Alberta
- By providing professional, scientific and engineering leadership
- By developing and introducing appropriate and leading edge technology into Alberta

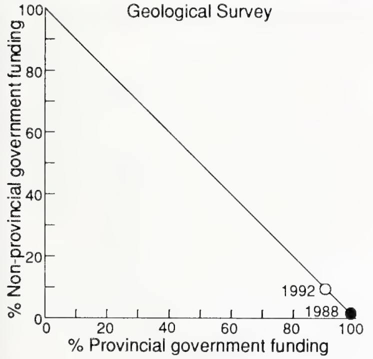
Serving clients and partners through science and technology

- Through the delivery of cost effective and timely solutions to technology problems
- Through the identification of leading edge technology required to meet international and domestic competition

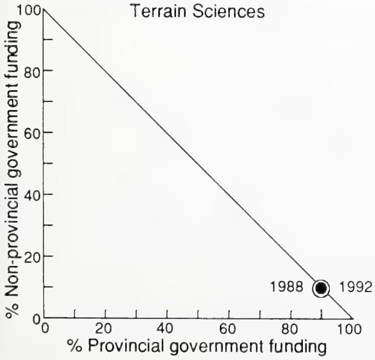
Creating a rewarding working environment for all staff

- That is healthy and safe
- Where innovation and creativity are valued
- Where synergy among individuals and teams is sought and encouraged
- That provides maximum opportunity for all staff to achieve their personal and career goals.

Appendix – Research Activities

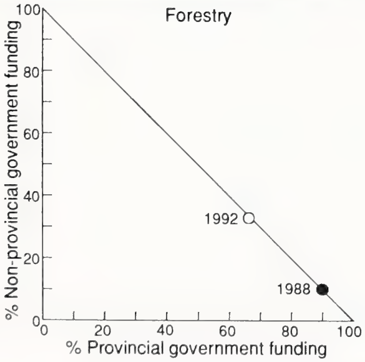


The Alberta Geological Survey provides the Alberta Government with geoscience information needed for environmentally responsible resource exploration and development. Most of the present projects are jointly funded by the Research Council and other Alberta Government agencies. In the foreseeable future, oil sands, basin analysis, coal and petroleum geology will remain research priority areas. Increased research in industrial and metallic minerals is currently under consideration. The application of modern geoscience information systems for decision-making in resource management, land use planning and policy development will receive high priority. The work of the Alberta Geological Survey is extensively used by the private sector. Although it will continue to be supported predominantly by government funding for its core geoscience work, the Alberta Geological Survey expects funding from non-government sources to increase slightly over the next four years.



The Terrain Sciences Department is a multidisciplinary department with the expertise required to develop and conduct research programs addressing natural resource management concerns and issues related to the earth's surface. The Research Council has developed new research programs related to soil and water conservation issues and land disposal of industrial wastes. Nevertheless, on a provincial level, the understanding of the Alberta landscape, its properties and how it functions, is inadequate to support the level of decision-making that is commonly required of resource managers. Nor has the resource management community developed adequate decision support systems for incorporating existing information about the Alberta landscape into decision-making processes.

The Research Council will assist in the development of cost-effective solutions to provincial land and water management issues through fundamental and mission-oriented applied research in the terrain sciences for both public and private sector clients. This will be accomplished by developing and building computer-based support systems for the agricultural, forestry, and energy industries. With demand for these tools expected to rise within government as well as within industry, provincial government-derived revenues are expected to remain in approximately the same proportion of total income as they are now.

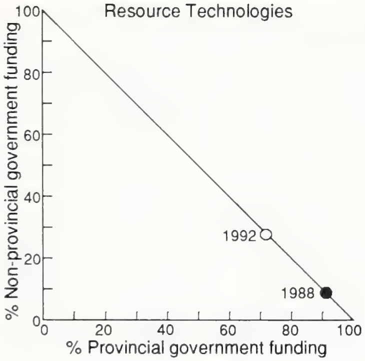


The **Forestry Department** at the Alberta Research Council was established in 1988 in response to the Alberta forest industry's request for support in the acquisition, organization and evaluation of forest land information systems to support forest management decision-making and for assistance in the development and market acceptance of forest products, principally those products classified as "engineered wood composites". One of the principal activities of the forest products program at the Alberta Research Council is to promote the utilization of the aspen resource. The panel development laboratory provides scale up facilities for the forest products panel industry. Work undertaken for Alberta companies has included development of new panel designs, optimization studies of commercial products, and tests of new resin and glue systems. Prototype panels have been developed using forest, sawmill and agricultural wastes as feedstocks. Experimental structural panels with novel geometry have been successfully produced and tested.

The forest products testing laboratory provides facilities for the testing of engineered, composite wood products, principally panels and structural components such as beams, to national and international standards. To accelerate acceptance of Alberta forest products in the North American market, the laboratory has successfully gained accreditation by the Standards Council of Canada. It is also recognized by the Canadian Standards Association and other agencies and organizations as a laboratory qualified to undertake a comprehensive series of testing activities in the forest products sector. A cross certification agreement has been signed with the American Plywood Association. Emphasis will be placed on accreditations and recognition of the laboratory by foreign agencies in Pacific Rim countries and in Europe which are perceived by Alberta industry as markets with high potential for growth. Target countries include Japan and the United Kingdom.

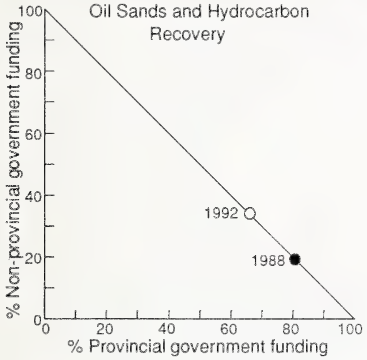
Generally, the forest products companies are expected to moderately increase their spending on research, development and testing services. New contractual relationships and operational approaches, such as joint ventures, are necessary to realize the full potential of these opportunities. Although continued government support for the program will likely be necessary, industry revenues are expected to increase in response to aggressive business development activity.

The **Resource Technologies Department** is comprised of a team of engineers and scientists dedicated to the application of technology to the development and management of Alberta's natural resources. New initiatives with provincial government departments and industry will be pursued, building on expertise in pavement design and evaluation, transportation and geotechnical engineering and in applied research in river engineering, hydrology, ice mechanics, water quality and ice hydraulics.

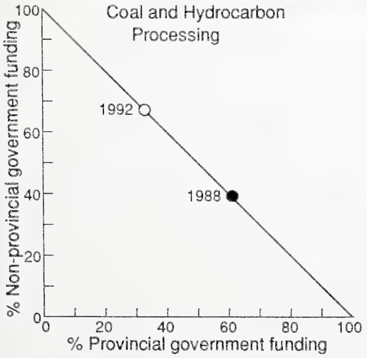


A new Climate Program is underway with a focus on technologies associated with research on regional weather and climate. Identified clients include Alberta Environment, Environment Canada and Alberta Agriculture. Of special interest to this program are issues related to regional air quality. In particular, the development of an environmental numerical modeling facility will be a key component of this program. Another area of interest involves extreme weather events. A recently formed consortium consisting of the Alberta Research Council, the University of Alberta, the Saskatchewan Research Council and the Atmospheric Environment Service of Environment Canada has the task of developing technologies relevant to predicting, detecting and tracking extreme weather events, such as the Edmonton tornado, in the prairie provinces. Potentially the most important task in the near future is the interpretation of climate-related information to predict, detect and quantify climate change on a regional scale and the development of appropriate adaptive strategies.

The established expertise in electronics, computing science, statistics and numerical modeling supporting these three programs is applicable to a variety of non-weather-related problems. A Remote Data Acquisition program will focus on instrument technology (hardware and software) related to radar, satellite, upper air, field and laboratory sensors. A Geographic Information Systems (GIS) Technology Program provides software support for applications in GIS systems, computer graphics, remote sensing, graphical and distributed databases. Based on market development projections, the Resource Technologies Department believes revenue from industrial sources will increase significantly by 1992.



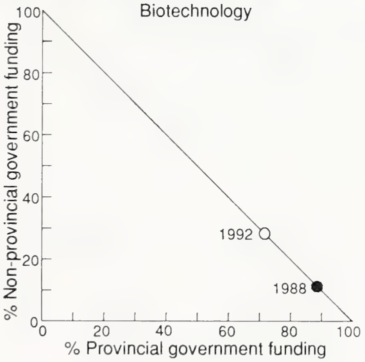
The **Oil Sands and Hydrocarbon Recovery Department** has close ties with the Alberta Oil Sands Technology and Research Authority and with Alberta oil companies through an Industry Access Program. While maintaining a primary focus on oil sands and heavy oil, the department plans to diversify into new areas where it has a nucleus of expertise and there are emerging needs, for example, in enhanced recovery of conventional oil, sour gas, offshore production and environmental protection. In addition, the Research Council's capability will be strengthened in production-related research such as solids control; measurement, control and transport of multicomponent production fluids; design and assessment of pumping equipment and systems; corrosion protection; and waxing problems. Opportunities for increasing industrial contract research will be pursued with the objective of acting as industry's research arm. By 1992, the Oil Sands and Hydrocarbon Recovery Department expects industry revenues to reach 34 per cent of its total budget.



The **Coal and Hydrocarbon Processing Department** undertakes research related to coal beneficiation and utilization, and to the upgrading of bitumen. The Research Council will be emphasizing opportunities for new technology developments and hydrocarbon-based industrial diversification. In both Oil Sands and Hydrocarbon Recovery and Coal and Hydrocarbon Processing, project opportunities to capitalize on expert systems technologies will be explored and implemented.

The industrial clientele will continue to include coal and oil producers, refiners, utilities and engineering companies. More emphasis will be placed on technology transfer and working with small- to medium-size enterprises to support the development of a broader industrial base for the province.

Currently, the majority of contracted research and development effort is with the Alberta Government, the Canadian and United States governments and major North American and Japanese companies. Opportunities for industrial contracts appear to be good, and could increase industrial revenues from 30 per cent to more than 60 per cent of the total budget by 1992.



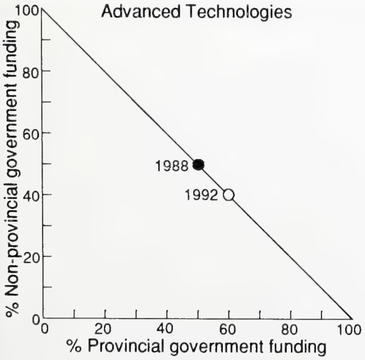
The **Biotechnology Department** operates a world class fermentation pilot plant designed to attract biotechnology companies to Alberta by providing the facilities for scale-up from laboratory bench research to initial production level. The Research Council has been successful in attracting users to the pilot plant facility to the extent that, after approximately one year of operation, the facility is fully utilized. The installation of a 15,000 litre fermentor and two 7,500 litre fermentors completes the latest expansion phase, giving the facility a fermentation capacity of more than 37,500 litres.

To be on the leading edge of this technology, the Biotechnology Department is instituting an active program of in-house technology development, particularly in bioengineering, process control, and downstream processing.

Up to this point, clients of the department have been selected largely on the basis of their ability to provide contract revenue. In the future, the clientele will be selected on the basis of their willingness to perform a major proportion of their research in Alberta and to locate their production and marketing facilities in the province. Contract revenues are expected to reach $1.4 million in 1990, and $4.4 million by 1997.

Development of a biotechnology industry in Alberta can be stimulated by the establishment of a pre-production scale pharmaceutical facility in the province. Such a facility would allow users to do scale-up and small scale production essential for toxicological assessment and clinical trials, using the best current technology available in the industry. Small pharmaceutical companies need such facilities to produce, under very rigorous conditions, suficient injectable material for such trials. Currently, these facilities exist only in Sweden, the United States and Japan. It is expected that, if one were built here, it would not only support Alberta's indigenous biotechnology companies but would have the power to draw pharmaceutical companies to Alberta.

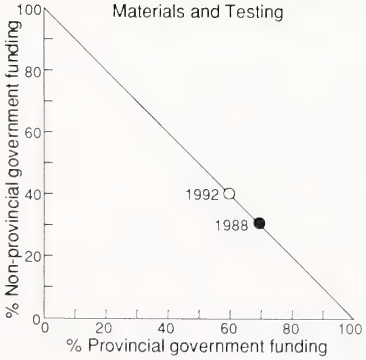
A conceptual plan has defined a facility that would be built in phases over a period of several years. In its final form it would include 4 x 150 L fermentors with the necessary up- and down-stream processing capabilities to allow the production of pre-clinical quantities of novel recombinant pharmaceutical materials derived from bacterial, yeast or other microbial systems. Such production, which may also include sterile finishing and packaging, would be carried out under conditions of Good Manufacturing Practice (GMP) consistent with regulations imposed by Canadian and U.S. authorities.



The **Advanced Technologies Department** was formed in 1984 with a mandate to lead in the diversification of the Alberta economy through technological innovation and industrial liaison in information and materials handling. This has led to the development of expertise in areas of artificial intelligence and automation. The department works with industrial clients to develop projects in expert systems, pattern recognition, distributed computing and robotics. In addition, a comprehensive technology transfer program incorporates workshops, seminars, internships and information services.

To assist industry in incorporating leading edge technologies, the Advanced Technologies Department provides practical expertise to companies. Feasibility studies, manufacturing assessments, fee-for-service contracts and joint research ventures enable companies to work with skilled professionals to enhance their competitive position.

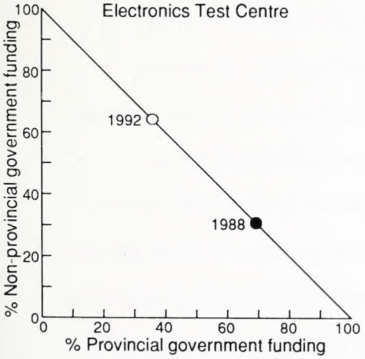
The Research Council and Alberta Technology, Research and Telecommunications recognized the importance of Alberta's manufacturing industry in providing future economic stability for the province. As a result of a jointly funded study to determine the needs of Alberta manufacturers for product development and advanced manufacturing technologies, a business plan has been prepared which calls for the Advanced Technologies Department to establish an Advanced Manufacturing Program, in coordination with Alberta Technology, Research and Telecommunications and the Canadian Manufacturing Association. In addition a product development initiative is being developed with SAIT. The department expects to maintain non-provincial government contract revenues at approximately 50 to 60 per cent of total revenues during the next four years.



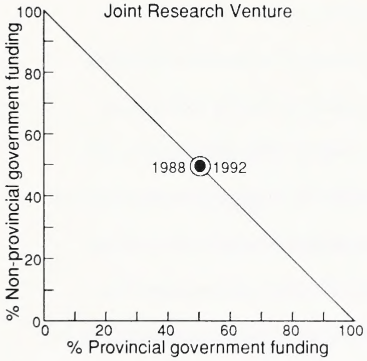
The **Materials and Testing Department** has concentrated on the development of testing laboratories and the delivery of analytical services to industry and to internal users. It has been shown that such laboratories are particularly effective as the "research arms" of many small- and medium-size companies. They also serve as developmental centres for the proving of innovative ideas, the development of new products and the accelerated acceptance of these products in the national and international marketplace.

The Materials and Testing Department sees opportunities for increasing revenues by about 10 per cent over current revenues.

There is growing awareness of the value of advanced industrial materials within Alberta industry. The department is developing a strong Advanced Industrial Materials program involving ceramics, metals and alloys, and to a lesser extent, polymers. The Alberta Research Council is engaged in discussions with Sherritt Gordon Limited, a company with an internationally acclaimed track record in new product and process commercialization, to explore the possibility of becoming a partner in a private sector/government consortium for commercializing advanced industrial materials.



The **Electronics Test Centre**'s mandate is to assist Alberta electronics companies in improving product designs and to increase Canadian and worldwide market penetration by providing testing, evaluation and related consulting services in a timely and cost effective manner. Product integrity evaluations, and testing for regulatory accreditations, are carried out for clients. The Test Centre has aggressively marketed its services to the other western provinces, and the northwest United States. In order for the Test Centre to cover more of its operating costs with revenues, it must continue to enlarge its markets in Canada and overseas. If successful, industry contracts could increase to 65 per cent of total revenues over the next three years.



The **Joint Research Venture Program**, now in its sixth year, was initially aimed at the high technology sector of the province. It is now a corporate-wide program designed to assist Alberta companies in developing technologies that they can transfer into the marketplace. Potential clients are Alberta industries that require the expertise of staff at the Research Council for the venture.

Under the Joint Research Venture Program, the Alberta Research Council and an Alberta company, usually small- to medium-size, share the project cost on a 50-50 basis. Recently, a move was made to provide full time management and support staff for the program, with contact people in both Calgary and Edmonton. To increase public awareness of the program, a media advertising campaign was undertaken.

The **Industrial Technology Advisor Network** provides technology awareness and advisory services to small- and medium-size enterprises throughout the province. Both the Alberta Research Council and the National Research Council contribute to this coordinated provincial and federal government program. The technology advisors deliver Industrial Research Assistance Program (IRAP) services, and administer an element of the Alberta Research Council's Joint Research Venture program with companies receiving funds to undertake smaller and potentially riskier projects.

N.L.C. - B.N.C.
3 3286 08954590 5